

## ABSTRACT OF THE DISCLOSURE

Devices and methods for cooling microwave antennas are disclosed herein. The cooling systems can be used with various types of microwave antennas. One variation generally comprises a handle portion with an elongate outer jacket extending from the handle portion. A microwave antenna is positioned within the handle and outer jacket such that cooling fluid pumped into the handle comes into contact directly along a portion of the length, or a majority of the length, or the entire length of the antenna to allow for direct convective cooling. Other variations include cooling sheaths which form defined cooling channels around a portion of the antenna. Yet another variation includes passively-cooled systems which utilize expandable balloons to urge tissue away from the surface of the microwave antenna as well as cooling sheaths which are cooled through endothermic chemical reactions. Furthermore, the microwave antennas themselves can have cooling lumens integrated directly therethrough.